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EDITORIAL.

Tea Restriction.

We publish in this number an article on the present position of the Malayan tea industry and of the agreement to restrict the development of the industry.

In view of the oft-avowed economic policy of the Government to aim at a greater degree of self-sufficiency in the production of foodstuffs, the advent of tea control—though justified under present conditions—came as a disappointment to those who visualized a marked expansion of tea production in this country. The agricultural development of Cameron Highlands in particular depends—as far as can be seen at present—on the tea planting industry in that area. The curtailment of expansion may retard the economic development of the Highlands for some time.

Tea production is of importance in Malaya, not only for the export trade, but in part to satisfy the large local demand. The normal Malayan consumption is sufficient to absorb the crop of 10,000 acres of tea in full bearing, and local production of tea for consumption in Malaya would not affect the signatory countries to the Agreement, as over 70 per cent. of the imported tea is produced by countries outside the Agreement.

The present Agreement is effective until 31st March 1938. It is evident, therefore, that negotiations on the terms of any new Agreement must soon be initiated. The Malayan representative on the International Tea Committee will no doubt bear in mind the facts and figures set forth in this article in advancing the Malayan point of view on this question.

Derris Cultivation.

Nearly two years ago an article appeared in this Journal giving a general survey of the position of the derris industry at that time. Subsequently, articles have appeared stating the results of further research work on various aspects of the subject. Keen interest in derris has been evinced on the appearance of these articles, both in Malaya and in other countries, and officers of the Department of Agriculture have received a large number of enquiries from various parts of the world. It has appeared convenient, therefore, at this juncture, to present a revised account of

the cultivation of this crop, embodying the results of recent research work. The article appearing in this number has been written by two of the officers most closely connected with the investigations.

It is manifestly impossible in the space of a short article to give more than an outline of the method of cultivation, and the results of research work; particular value therefore attaches to the list of articles which have a bearing on the subject.

Hitherto a number of varieties of derris have been cultivation in Malaya and the toxicity of root offered for sale has therefore shewn a wide variation. With additional knowledge of toxic values, and the clonal propagation of varieties that are superior in this respect, we may visualize the gradual diminution of those of less value, leading to a considerable improvement in the standard of exports and an enhanced reputation for Malayan derris.

Orange Cultivation.

The Mandarin orange is the most important local citrus and appears well-suited to Malayan conditions. An article by Mr. J. N. Milsum on "The Local Mandarin Orange" appears on another page in which the merits of this fruit and the methods of cultivation are stated.

The article is important as a contribution towards the efforts being made to encourage fruit production in this country. Local production of fruit is inadequate to satisfy the demand, in consequence of which imports are considerable. While many of the imported fresh fruits are of varieties that are unsuited for local production, there is little doubt that an improvement in the quality and improved organization in the marketing of Malayan fruits would popularize them amongst the public and thus they would supersede imported fruits.

Progress in the task of improving the quality of Malayan fruits is inevitably slow, but it is sure, while the improved methods of vegetative propagation now being employed will further accelerate progress.

Original Articles.

THE MALAYAN TEA INDUSTRY

BY
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In view of the recent entry of Malaya into the International Tea Agreement, the following survey of the Malayan industry is presented in order that the position may be clearly understood.

Malayan Imports, Production and Consumption.

The average annual net imports of tea into Malaya from 1923 to 1931 were 8,380,000 lbs. Since the latter year, the average annual net imports have been 2,830,000 lbs. of black tea and 1,184,000 lbs. of green tea—a total of 4,014,000 lbs. per annum.

The gross imports of tea in 1935 and the countries from which they were obtained are shewn in the following table.

Table I.
Gross Imports of Tea into Malaya during 1935.
in lbs.

Black Tea		Green Tea	
United Kingdom ...	8,931	Ceylon ...	85
British India ...	14,834	Hong Kong ...	3,213
Ceylon ...	728,498	Sarawak ...	280
Hong Kong ...	4,750	China ...	770,710
Sarawak ...	200	Japan and Formosa ...	667,035
China ...	1,550,755	Netherlands Indies ...	9,948
Japan and Formosa ...	567,093	Siam ...	60
Netherlands Indies ...	697,569		
Siam ...	426		
Total ...	3,573,056	Total ...	1,451,331

Thus, of total imports in 1935, 64 per cent. of the black tea and 99 per cent. of the green tea—or 71 per cent. of all imports—were obtained from countries outside the International Tea Agreement.

Production.—Tea can be grown in Malaya at all elevations from sea level up to the highest points. The indications are that the quality of the teas grown on lands of, say, over 3,000 feet elevation are superior to those grown at low levels, although as far as evidence available can be relied on, there appear to be some grounds for thinking that the quality of lowland Malayan tea is at least equal to that of low-country Indian and Ceylon tea. In considering the yields of Malayan tea it must be realized that although several areas are now in production, there are no considerable areas which have reached an age of maximum production. The yields of lowland tea in Malaya are higher than those of upland tea; yields of 1,000 lbs. of made tea per acre, or even more, have already been obtained from lowland areas, while from upland areas at levels of about 4,000 to 5,000 feet, yields of from 800 to 900 lbs. of made tea can be obtained. In one case, a yield of 1,100 lbs. per acre per annum has been obtained from a 20 acre block of high-land tea. The reason for high yields of tea in this country is to be found in the climate rather than in the fertility of the land. The heavy rainfall, fairly evenly distributed throughout the year, is conducive to frequent and heavy "flushes". Yields of both upland and lowland areas are thus much higher than those obtained in India and Ceylon.

These heavy yields are not connected with low quality. The general run of upland Malayan teas compare favourably in quality with the general run of mid-country (and up-country) teas of Ceylon and India and realize comparable prices.

Table II.

Area planted with Tea, Malaya.

(Estates only, shewing years of planting).

Acres.

	Before 1930	1930	1931	1932	1933	1934	1935	1936	Total Area	Reserve Land
Upland Estates ...	116	325	162	96	41	55	271	374	1,440	5,780
Lowland Estates ...	773	498	32	—	—	6	98	70	1,477	1,986
Total Area ...	889	823	194	96	41	61	369	444	2,917	7,766

The Malayan production and sale of tea from estates during the past few years is shewn in Table III.

Consumption.—The consumption of tea may be estimated from the net imports plus local sales of Malayan tea. Thus, for the year 1936, local consumption amounted to 4,184,543 lbs., or rather less than 1 lb. per head of population. This

Table III.

Malayan Production and Exports of Tea.

(Estates only)

in lbs.

Year.	Upland.			Lowland.			Total		
	Produced	Exported	Sold Locally	Produced	Exported	Sold Locally	Produced	Exported	Sold Locally
1930	—	—	—	95,040	35,730	59,310	95,040	35,730	59,310
1931	—	—	—	127,988	31,000	95,662	127,988	31,000	95,662
1932	4,382	—	3,161	138,694	16,472	123,101	143,076	16,472	126,262
1933	39,440	6,990	29,958	172,449	59,952	118,997	211,889	59,942	148,955
1934	115,874	44,072	64,510	228,497	74,843	152,789	344,371	118,915	217,299
1935	212,927	163,787	30,431	418,735	238,189	173,583	631,662	401,976	204,014
1936	327,796	253,308	79,162	616,970	397,074	210,788	944,766	650,382	289,950

is very much less than the average consumption before the trade depression when consumption reached 2½ lbs. per head.

The International Tea Agreement.

The International Tea Agreement was inaugurated in 1933 by representatives of the tea-growers of India, Ceylon and the Netherlands Indies, and became operative for five years from 1st April 1933. The object of the Agreement was to restore the equilibrium between supply and demand by regulating the exports of tea from these three countries. It was further provided that no new areas were to be planted, that replanting should be allowed only on land from which tea bushes had been removed, and that the export of viable tea seed should be prohibited.

The executive body for this scheme of tea control is the International Tea Committee, consisting at the present time of official and unofficial representatives of producing countries that have joined the scheme.

In addition to the above-mentioned countries, the East African Dependencies of Kenya, Uganda, Tanganyika and Nyasaland have agreed to participate to the extent of limiting new plantings of tea during the currency of the agreement. Extensions in these Dependencies have therefore been agreed as follows:— 1,000 acres for Kenya, 2,000 acres for Uganda, 2,900 acres for Tanganyika and 2,000 acres for Nyasaland, which when planted would bring the planted area in the Dependencies to a total of 39,340 acres. They have also agreed to restrict replanting to areas which have been properly maintained, and to prohibit the export of tea seed.

Southern Rhodesia has joined the scheme on the basis of a limitation of the total planted area to 1,000 acres.

Mention is made later of the terms upon which Malaya eventually agreed to join the scheme.

Japan, China and Formosa, all important tea-producing countries, are outside the scheme, as are also a number of less important producing areas such as Russia, Portuguese East Africa, Natal and Indo-China.

It will be noted that the extent of participation of countries other than the three original participators is confined to restrictions of further development and not to the quantity of tea exported.

The standard production, based on maximum exports of tea in any of the years 1929, 1930, or 1931, was fixed as follows:—

	lbs.
India	382,594,779
Ceylon	251,522,617
Netherlands Indies	173,597,000
Total ...	807,714,396

The percentage figures of regulation have been as follows:—first year 85, second year 87½, third year 82½, fourth year 82½, fifth year 82½. For the sixth year, 1st April, 1937 to 31st March, 1938, the percentage figure has been increased to 87½.

The following table condenses such information of the areas and exports of tea as is available in the annual reports of the International Tea Committee.

Table IV.

World Tea Areas and Exports.

Country	Planted Area end of 1934. Acres.	Exports of Tea in million lbs.				
		Calendar Year		Year ending 31st March.		
		1929	1933	1934	1935	1936
REGULATING COUNTRIES						
India ...	838,019	382.9	381.1	322.6	337.9	320.0
Ceylon ...	558,775	251.6	258.8	197.0	220.2	215.9
Netherlands Indies ...	480,420	159.7	186.6	136.2	145.2	146.5
Total ...	1,877,214	794.2	826.5	655.8	703.3	682.4
CONTROLLING NEW PLANTING ONLY						
Nyasaland ...	15,414	1.8	3.0	3.7	5.4	6.7
Kenya ...	12,667	.0	1.1	2.0	2.9	6.0
Uganda ...	1,285					
Tanganyika ...	2,050	.4	.3	.4	.4	.5
S. Rhodesia ...	260					
Malaya ...	2,705					
Total ...	34,381	2.2	4.4	6.1	8.7	13.2
OTHER COUNTRIES						
Japan ...	95,000	23.7	27.8	32.9	28.9	37.3
Formosa ...	110,000	18.3	14.9	16.6	22.2	20.4
Russia ...	86,500					
Union of South Africa ...	2,059					
Mozambique ...	2,125					
China ...		126.4	91.4	91.5	102.1	91.0
French Indo-China ...		2.2	1.5	1.6	2.8	2.5

Malayan Entry into the Scheme.

Malaya entered the International Tea Agreement in 1936 on the following terms. It was agreed that extensions during the present Agreement (*i.e.* until the end of March 1938) should be limited to 3,000 acres in excess of the 2,700 acres already planted. Furthermore, the export of tea seed to be prohibited. There are no restrictions on the export of made tea.

Enactments.

To give effect to the Agreement, the following legislation has been effected in Malaya:—

Federated Malay States, Enactment No. 53 of 1936.
Straits Settlements, Ordinance No. 33 of 1936.
Johore, Enactment No. 33 of 1936.
Perlis, Enactment No. 18 of 1355.
Kedah, Enactment No. 17 of 1355.

The terms of the various Enactments and Ordinances and the Rules thereunder are in general agreement. They specify *inter alia* that every owner of land on which tea was growing on 1st January, 1937, shall furnish to the Tea Controller at an early date full particulars of area, situation, class of tea, dates of planting and capacity of factory—if any. Further, they declare that no tea shall be planted on any land which was not planted with tea on 1st January, 1937, except in accordance with the conditions of a licence granted by the Controller. Licences to plant tea are not transferable. No tea seed shall be exported except in accordance with conditions of a licence granted by the Controller; such licence is not transferable.

THE LOCAL MANDARIN ORANGE

BY

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As a basis for the study of citrus in Malaya, attention has been directed to the race of thin-skinned oranges which appear in the markets throughout the country. This citrus is usually referred to under the name of Mandarin orange and is known to the Malays as "limau manis" in common with other sweet oranges. The botanical nomenclature of this citrus has recently been revised by Prof. Tyozaburo Tanaka of Formosa, who now identifies it as *Citrus suhuiensis*, Hort., the Suhuikom of Canton.

This orange is planted fairly extensively in small orchards by Chinese, particularly near the large towns where a ready market exists for the disposal of the fruit. Isolated trees are frequently seen, but it is the commercial aspect of local orange growing that forms the subject of this article. Unfortunately for the growers, severe competition exists in the form of imports of Mandarin oranges from China in the winter months, and of tight-skinned sweet oranges (*C. sinensis*, Osbeck) from America and Australia almost throughout the year. The latter orange is comparatively expensive but satisfies the demand, mainly from Europeans, for the more attractive orange to which they are accustomed. Although several aspects of the cultural treatment of the local Mandarin orange are imperfectly known, available information is recorded, in the hope that extension of production may result. The climate of the lowlands of Malaya precludes the production of fruit of equal flavour and appearance to that imported from China, but there yet remains the possibility of more successful production at higher elevations, or in the more suitable parts of the country. It is obvious, however, that adequate cultivation is necessary to ensure success with oranges in Malaya, since neglect results in rapid deterioration of the trees.

Nomenclature.

There is considerable diversity of form of Mandarin oranges in the Orient, but the race cultivated locally is comparatively uniform. In fact it may be termed an acclimatized race, imported by Chinese growers from Canton. According to Prof. Tanaka, this citrus was originally identified as *C. nobilis*, Lour., but after comparison with races in Java, it was considered to have closer affinity with certain thin-skinned oranges of that country, and was provisionally named *C. retusa*, Hort., ([1] & [2]). Later, after Prof. Tanaka had examined living material in Malaya, he formed the opinion that the local orange and the Suhuikom of Canton are identical. The scientific name of the local Mandarin orange is, therefore, according to the identification of Prof. Tanaka, *C. suhuiensis*, Hort. ([3]). The following is a brief description of this citrus.

"Leaves oblong to oblong ovate, ends rather acute. Fruits large, depressed-globose, shoulder rather slender, smooth and orange-coloured. The rind very thin, central column large, hollow, pulp orange-coloured. Pulp vesicles coarse grained, sweet and good flavour. Seeds large and very plump, polyembryonic, tegmen at chalaza purplish".

Under local conditions the fruit is 2.25 to 2.75 inches in diameter, and 2 to 2.25 inches high, skin shining, greenish to yellowish-green in colour, with undulations showing the interior segments.

Propagation.

The local Mandarin orange is invariably propagated from marcots by Chinese growers. A stock of marcots is maintained and used to replace diseased trees or to extend the area under cultivation. Marcots are ready for planting in four months from preparation; they are planted during rainy weather and soon become established. It is proposed to investigate the possibilities of rooting soft-wooded cuttings in enclosed frames, since work conducted in Ceylon suggests that this method offers possibilities (4).

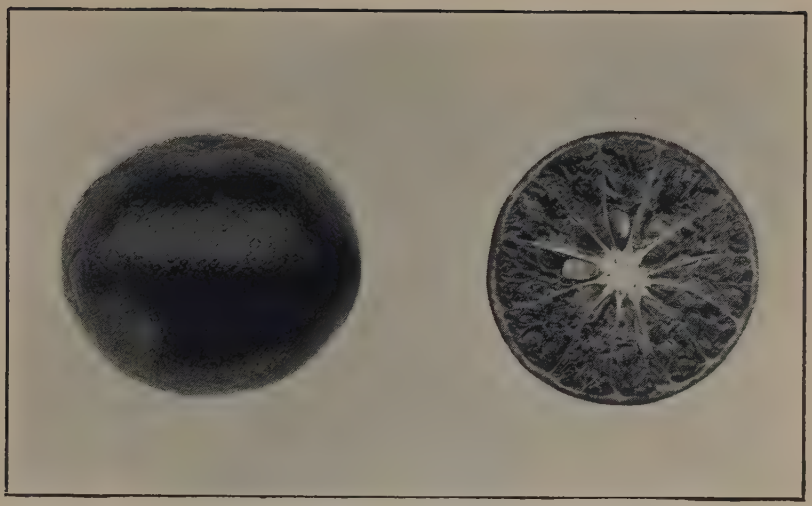
Budding on a large scale has not been attempted. This form of propagation is likely to require an extended investigation since a stock, resistant to disease and suitable for local conditions, is necessary to ensure success. The Japanese citron, sweet orange, and rough lemon have all been employed successfully as stocks for Mandarin oranges in Java (5). Further trials may prove that these stocks are suitable in Malaya.

Cultivation.

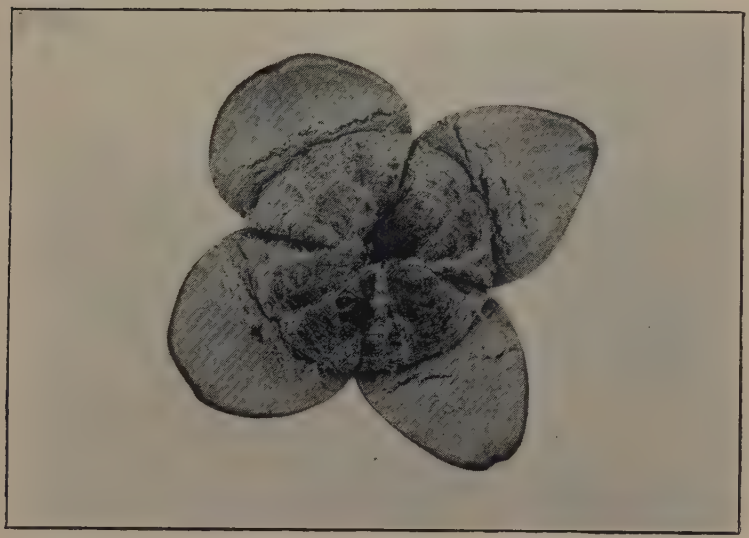
The land selected by Chinese growers for planting Mandarins is usually low-lying areas with a moist subsoil. Shallow drains are constructed between each row of trees and the soil mounded in the rows. It is essential that free drainage be provided, otherwise trees rapidly die in soil where water stagnates. The few trees that have been seen growing on high elevations show good growth and production.

Planting distances vary from 12 feet to 20 feet apart. A six-acre orchard which was inspected had the rows spaced 16 feet apart and the trees 25 feet apart in the rows (108 trees per acre). A common planting distance adopted is rows 12 feet apart, the trees being spaced 20 feet apart in the rows *i.e.* 181 trees per acre. In China, where growth is slower and the trees are carefully pruned, a closer planting distance is employed.

The majority of growers take considerable care in planting the marcots, removing a quantity of soil from the planting hole and replacing it with good yellow soil mixed with ashes and slaked lime. The land is weeded and soil from the surface drains mounded round the young trees in order to provide extra rooting space.



LOCAL MANDARIN ORANGE, *Citrus suhuiensis* (reduced).



FRUIT SHOWING PEELABLE SKIN (reduced).

FRUITING BRANCH OF *C. suhuiensis* (reduced).

No standard system of pruning is employed, but all small inner branches are removed with the object of obtaining a wide fruiting frame. Water suckers are periodically cut out. Owing to the dense habit of this orange, a well-developed frame is essential for maximum fruit production.

Manuring is generally undertaken and varies in procedure according to the resources of the grower. Owners of small orchards merely place manure and wash from the pig-sty below the trees at infrequent intervals. In large orchards the trees are usually manured with fish refuse, soya bean cake or groundnut cake at the rate of about 8 lbs. per tree once or twice a year. The variation in manurial treatment probably results in the marked disparity in the appearance of the trees seen in the various orchards that have been visited.

Yields.

Young trees commence to bear fruit in four years from planting and may continue to bear crops up to 10 to 15 years old. Unfortunately, through the incidence of root disease, many mature trees die, and a perfect stand of trees is the exception rather than the rule. The trees bear fruit throughout the year, but there are two main cropping seasons *i.e.* February to May and July to November. The heaviest cropping month is stated to be September.

It is not possible to estimate yields per acre owing to differences in the ages of the trees and, in many cases, unequal planting distances. Good trees are estimated to produce fruit as follows:—

After 4 years old			20	kati	fruit per tree
,, 5	,,		70	,,	,,
,, 6	,,		100	,,	,,
,, 7	,,	100 to 200	,,	,,	

(1 kati = 1 1/3 lbs.)

Fruits vary in weight, but sound marketable produce averages four fruits per kati. The entire crop is usually sold under contract to retailers in the various markets. The sale price depends upon season and quality of fruit. During the winter months, when oranges from China are in season, there is a poor market for locally-produced oranges. Good quality local Mandarins realize wholesale prices of $4 to $5 per picul (= 100 kati) during the season February to May, and $7 to $10 per picul from July to November. Small fruits are only saleable at $2 per picul, and in estimating monetary returns a proportion of undersized fruit must be allowed for.

Diseases and Pests.

The Mandarin orange tree in China is very susceptible to a destructive bark-rotting disease, in which a white froth exudes from longitudinal cracks in the bark of stem and branches. This disease has not yet been recorded in Malaya, where the principal disease is a decay of the roots of trees growing in heavy soil with

poor drainage, which tends to bake in dry weather and become waterlogged in wet weather. The same disease occurs in light sandy soils, which do not retain sufficient moisture to promote vigorous growth.

Insect pests are evident, but do not appear to receive much attention. In one orchard, however, fresh derris (tuba) solution was employed as a spray at regular intervals, a small area of land in a corner of the orchard being set aside for the cultivation of derris.

Related Races.

The King orange, more correctly named King of Siam, is the typical form of *C. nobilis* as described by Loureiro in 1790. It is described as having comparatively large fruits, with a thick rough skin of a deep orange colour, which adheres to the segments, and flesh of an excellent flavour. This orange is widely grown, but so far does not appear to have become established in Malaya. It thrives well in the surroundings of Batavia and should prove satisfactory in this country. The King orange is described and figured in Ochse's book ([6]) as *C. nobilis* var. *typica*.

The satsuma orange, *C. Unshui* Marc., which is grown extensively in Japan and recently has been canned for export to Europe and other parts, has already been introduced into Malaya. *C. Sunki*, Hort. is considered to be a suitable stock and plants of this species have also been established by the Department. The Satsuma orange is seedless and of good flavour and numerous Japanese varieties are known. It is the hardiest species of the Mandarin type of orange but there is some doubt whether it will become acclimatized in this country. Fruit produced in Java is stated to be rather flavourless.

Imported Mandarin Oranges.

Five varieties of Mandarin oranges are imported into Malaya from China, and arrive in considerable quantity in December and January. These are known locally under the following Cantonese names and are described below:—

Chew Kum. *Citrus tankan*, Hayata. It is called Tankan in Formosa, and is described and figured in the *Journal of Heredity* ([7]). This variety is stated to be imported from Swatow and represents about 60 per cent. of the total importation of Chinese Mandarin oranges. It is a medium-sized fruit with few seeds. The shape is rounded with a rather thin tight-fitting skin. Large quantities are imported into Malaya from January to April.

Loo Kum. *C. chrysocarpa*, Lush. This is the famous Ponkan of southern China and Formosa, and the Santra of India. It is also described and figured in the *Journal of Heredity* ([7]). This orange is in season during November and December, and is stated to be imported from Amoy. The fruit is large, rather flattened with a depressed apex and loose-fitting skin. The segments are easily separated and surround a hollow cavity.

Fook Kum. *C. tangerina,* Hort. Identical with the Dancy Tangerine of America. It is stated to be imported from Foochow and is in season during November and December. The fruit is small, flattened, with deep orange-red coloured skin, which is rather loose-fitting.

Mut Kum. This variety is imported from Swatow and is on sale during November and December. The skin is thick, a deep orange-red colour, smooth, and easily peeled. The flesh is a reddish colour with rather watery pulp. The centre of the segments is hollow. According to Prof. Tanaka, this orange is called Mi tan kan in Swatow, and is considered identical with the Ponkan, described above.

Kong Kum. Imported from Canton and in season during November and December. The skin is yellow, thin, and smooth. The flesh is yellow in colour with a hollow centre between the segments. In China the dried peel is used for medicinal purposes.

Acknowledgments.

The writer is indebted to Prof. Tyozaburo Tanaka, of the Taihoku Imperial University, Taiwan, for identifying *Citrus suhuiensis* and for additional notes on the imported citrus fruits. Acknowledgment is also made to Mr. Lau Sing Nam, Chinese Sub-Inspector of Agriculture, Selangor, for assistance in describing the Mandarins above, and to the Government Mycologist, Straits Settlements and Federated Malay States, for the note on root disease.

References.

(1) An Enumeration of the species of Paramignya, Atalantia and Citrus, found in Malaya. I. H. Burkill, *Gardens' Bulletin, S.S.,* Vol. V, page 212, 1931.

(2) Dictionary of the Economic Products of the Malay Peninsula. I. H. Burkill, Vol. I, page 561, 1935.

(3) Citrus and Citrus Relatives in China. T. Tanaka, *Lingnan Science Journal,* Vol. VII, page 345, 1929.

(4) Propagation of Citrus. A. V. Richards, *Tropical Agriculturist,* Vol. LXXXVII, page 269, 1936.

(5) Fruit Cultivation in Java. J. N. Milsum, *Malayan Agricultural Journal,* Vol. XXII, page 313, 1934.

(6) Fruits and Fruit Culture in the Dutch East Indies. J. J. Ochse and R. C. Bakuizen van den Brink, page 132, 1931.

(7) Oranges of the Orient. T. Tanaka, *Journal of Heredity,* Vol. XX, page 37, 1929.

DERRIS CULTIVATION IN MALAYA

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Introductory.

There has been in recent years a growing world demand for insecticides of vegetable origin, which are comparatively harmless to human beings, to replace the more dangerous arsenical preparations. Among such insecticides is derris (*akar tuba,* Malay) which has been used in this country from time immemorial as a fish poison.

Public interest in the possibilities of derris cultivation is very considerable and the present article has therefore been written with the object of providing in a concise form the latest available information dealing with the cultural side of the industry.

A large amount of work on this crop has been undertaken by the Department, the results of which have been published from time to time in this Journal. Reference will be made to these papers so that readers desiring further information will be able to obtain the necessary details.

Varieties.

The genus Derris comprises two known species of economic importance, *D. elliptica* and *D. malaccensis.* Several varieties occur within each species. It is to be noted that the term variety is used here in the sense of a sort or modification subordinate to a species.

The following is a complete list of the varieties included at present in the two species referred to above and cultivated in Malaya.

Derris elliptica
- Changi Nos. 1, 2 and 3
- Singapore Nos. 1 and 2
- Sarawak creeping

Derris malaccensis
- Kinta type
- Tuba merah
- Sarawak erect

Botanical descriptions of *D. malaccensis,* Sarawak erect, and of the different varieties of *D. elliptica* have been published (1), also preliminary descriptions of *D. malaccensis* (Kinta type) and Tuba merah (2). In the case of the varieties of *D. elliptica,* investigations showed that they were only distinguishable by minor

characters, such as habit and leaf formation. *D. malaccensis* (Kinta type) and Tuba merah are also closely allied, the only distinguishable feature noticed to-date being possibly a slight difference in habit.

As mentioned above Sarawak erect has been described botanically and given the name of *Derris malaccensis* var. *sarawakensis*, Henderson. The English name is used, however, in preference to the Latin to avoid a confusion of nomenclature and to conform with that adopted for the other varieties.

Comparative Toxic Contents of Varieties.

While correct comparative evaluations of the toxicities of roots of the different varieties can be obtained only as a result of controlled experiments on various classes of insects, chemical tests constitute the means by which commercial consignments are valued. Thus, at present, the rotenone content and/or the ether extract of the root are invariably used as a basis for purposes of valuation. These chemical tests must, however, be regarded as arbitrary since on neither basis is it possible to compare accurately the insecticidal values of roots of different varieties.

For some years past there has been a vogue in certain markets for rotenone and at the present time a better price is obtainable for a product combining a high rotenone content and ether extract than for root containing the same amount of ether extract with only a small proportion of rotenone.

The present standard for ether extract may be either 18 or 20 per cent., calculated on the commercially dry root as offered for sale. A premium is sometimes given if the ether extract is in excess of the specified figure, while a reduction in price is invariably made if the root fails to conform with the standard. As regards rotenone, the minimum figure on which transactions are based is usually 5 per cent.

Table I shows the variations found to-date in rotenone content and ether extract for roots from two-year old plants of all the varieties mentioned above.

The moisture content of commercially dry root in Malaya is approximately 10 per cent.; this may be reduced to about 5 per cent. during transit to Europe. Such a reduction is unavoidable owing to less humid conditions in temperate climates. To calculate the corresponding figures based on either of the above moisture contents, the figures recorded should be multiplied by 0.9 in the case of root offered for sale in Malaya and 0.95 for that sold in Europe. For example, a rotenone figure of 9.0 per cent. on a moisture-free basis corresponds to 8.1 per cent. on a 10 per cent. moisture basis and 8.5 per cent. on a 5 per cent. moisture basis.

The figures tabulated indicate that the first choice as regards variety is *D. elliptica*, Changi No. 3, since it combines high rotenone with high ether extract. It is closely followed by *D. elliptica*, Sarawak creeping, which would appear to have the advantage over *D. elliptica, Changi* Nos. 1 and 2, by reason of a slightly higher ether extract.

Table I.

Comparative Toxic Contents of Derris Varieties.

Species and Variety	Rotenone (Moisture-free basis)			Ether Extract (Moisture-free basis)		
	Maximum	Minimum	Average	Maximum	Minimum	Average
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
Derris elliptica ...						
Changi No. 1 ...	9.0	2.0	6.0	28.5	9.0	21.5
Changi No. 2 ...	8.5	5.5	6.5	27.0	18.5	22.0
Changi No. 3 ...	13.0	6.0	9.0	31.5	20.5	27.0
Singapore No. 1 ...	6.5	4.0	5.5	19.5	13.5	16.0
Singapore No. 2 ...	6.5	5.5	6.0	17.0	15.0	16.0
Sarawak creeping ...	7.5	1.5	6.0	29.5	5.0	25.0
Derris malaccensis ...						
Kinta type ...	1.0	Nil	0.5	22.0	14.5	19.0
Tuba merah ...	1.5	0.5	1.0	21.5	18.0	19.5
Sarawak erect ...	4.0	1.0	3.0	27.0	6.0	20.5

The three varieties of *D. malaccensis* contain only a moderate proportion of ether extract, the Sarawak erect variety being slightly superior to the Kinta type. As its name implies the latter variety is widely cultivated in the Kinta District of Perak, where it seems particularly well suited to the local conditions. It is estimated that nearly 1,500 acres are planted with this variety. The root is sold on an ether extract basis, the rotenone content being negligible.

The wide variations in toxicities of roots of individual plants indicate the possibilities of improvement of quality of product as a result of selection of planting material. As a result of carrying out a large number of analyses of such roots it has been found possible to establish (a) mixed populations of plants of superior toxic content and (b) clonal forms. The latter include only those plants in which the roots of the parent plants were outstanding in respect of rotenone content and/or ether extract. A description of the selection work in progress has already been published ([3] & [4]).

While at present the extent to which toxicity is an inherent character is uncertain there are indications that the proportions both of rotenone and of ether extract remain constant within limits for successive generations. Should a much closer relationship be found to exist the value of clonal material will be of the greatest importance since it will permit of the export of a standard product. This

will enable derris to withstand competition from other vegetable insecticides possessing toxic principles of a similar nature, notably cubé root (*Lonchocarpus* spp.) from South America.

Soils.

Derris grows satisfactorily on a fairly wide range of soils, but is preferably planted on land of a friable nature to allow of ample root development and to facilitate harvesting. Good growth is seen on the lighter coastal alluvial soils and also on peat, but in the latter instance the height of the water table is a limiting factor. Hilly land should not be chosen owing to liability to soil erosion and the risk of shortage of moisture. Inland, gravelly soils and those containing a high proportion of clay are generally unsuitable, mainly on account of impermeability to root penetration and difficulty in harvesting.

The crop is grown successfully on exceptionally sandy soils both on Singapore Island and in the Kinta District of Perak, in the latter instance even on old tin-mine tailings. In both these cases, satisfactory crops are secured as a result of frequent applications of liquid manure. Such a procedure is only possible where derris is grown under market garden conditions.

The extent to which the toxic content of the root is influenced by changes in soil conditions is not yet known. An account of some preliminary work on these lines has already been published ([5]). The results showed that the toxic content was not affected to any marked extent as a result of change in environment. Further work on these lines is being undertaken with clonal material.

Propagation.

Derris is propagated from mature cuttings, but certain varieties root more readily than others. *D. elliptica,* Changi No. 3, is most satisfactory in this respect and even cuttings consisting of a single node will root readily. Generally, cuttings 9 to 12 inches long are employed; these are planted closely in shaded beds and kept moist. Short cuttings are suitable for varieties of *D. malaccensis*. Rooting may often commence within three weeks of taking the cuttings. A rooting propensity is an important varietal attribute if stocks of high-grade clonal material are scanty. The cuttings when rooted are lifted and transplanted, preferably during wet weather. Cuttings may also be planted direct in the field, but many vacancies occur if dry weather prevails.

The method often adopted by Chinese growers in Singapore is to plant long cuttings, twisted into a circle at the lower end, direct into the field at wide distances apart. As lateral branches develop these are layered in order to induce subsidiary root formation.

Cultivation.

Planting systems differ with circumstances. In general, the planting distance recommended is 3 ft. by 3 ft. (4,840 plants per acre). A closer system is often adopted at Kinta when planting direct in the field, in which case two cuttings are used per hole, necessitating a large amount of planting material.

Owing to the comparatively close planting distance adopted for this crop, it is necessary to clean-clear the land before planting. On flat land adequate drainage is essential as derris fails to grow satisfactorily on land holding stagnant water.

Supplying, if necessary, should be undertaken at an early opportunity, in order to secure an even stand of plants. Regular weeding is necessary, particularly during the early stages of growth, to lessen competition and to enable the plants to become firmly established. With certain varieties, *e.g. D. elliptica,* Sarawak creeping, and to a lesser degree Changi No. 3, their prostrate habit and characteristic stem-rooting propensity result in early suppression of weeds and the formation of a complete cover over the land. In contra-distinction, *D. malaccensis* var. *sarawakensis* has an erect habit necessitating frequent weeding throughout the entire growing period.

In the Netherlands Indies, staking the prostrate plants is recommended, with a result, it is claimed, of an increase of crop approximating to 30 per cent. Such a system necessitates additional expense for poles and more frequent weeding.

On virgin land manuring is unnecessary, since growth of the plants and root production are usually satisfactory. Derris removes considerable amounts of plant nutrients from the soil (5) and, therefore, some form of manuring is necessary if subsequent crops are planted on the same land.

A preliminary manurial experiment conducted at the Central Experiment Station, Serdang, showed that an increased yield results from the application of fertilizers and lime (5). A basic fertilizer is recommended, but the results of further experiments are necessary before detailed advice can be given.

No information is as yet available as to the extent to which toxic content can be influenced by manuring. Such an experiment is best carried out with clonal material, when the errors due to variations in toxic content between individual plants can be reduced to a minimum.

Chinese growers secure high yields of root as a market garden crop by combining derris cultivation with pig farming, using the manure so obtained as a fertilizer. *D. elliptica,* Changi Nos. 1 and 2, are grown on Singapore Island and under the special conditions of cultivation these varieties tend to develop a proportion of long whippy roots, which are baled without drying and exported to China for use in a fresh state. Such root is also offered for sale in the local markets.

Derris is a short duration crop and lends itself readily as a catch-crop during the initial stages of a more permanent form of cultivation. It is, however, a sun-loving plant and fails to thrive once it is shaded. Owing to its climbing nature, derris should not be planted too near the main crop.

Harvesting.

It has previously been considered that the toxic content of the root reaches a maximum when the crop is about 24 months old. Recent work with individual plants has given indications of the development of toxic content at a much earlier age, the quantity of root merely increasing as the plant matures. The experiments have, however, not yet reached the stage when a final conclusion is possible about the optimum age for harvesting and for the present, cropping is advised when the

plants are between 18 and 24 months old, depending upon growth and root formation. If the crop is allowed to remain on the land too long, the plants have a tendency to develop thick roots, which may not be acceptable to the trade.

When harvesting, all stems and branches are removed and the whole of the root systems lifted with the stumps. Provided the soil is sufficiently light in texture, harvesting is readily done with the ordinary Assam fork. It is immaterial whether the roots are broken during the process, though care must be taken to lift all the roots, including the finest, which have a high toxic content (6). After harvesting, the material is taken to a sorting shed.

Chinese growers in Singapore employ a system whereby only the lateral roots are harvested, leaving the main or tap root to support the stems and leaves until growth recommences. The branches are laid flat on the ground again and covered with soil at close intervals to induce further root formation. This procedure may be continued for a number of years. A sandy soil favours this form of cultivation and it is obvious that adequate manuring is necessary to ensure continuous root production under such conditions.

Preparation of Root.

The roots are roughly cleaned and all portions of stem removed. The stems have practically no toxic properties and are therefore unacceptable to the trade, sellers being penalized if such material is present.

After cleaning, the root is dried. The simple method used by the small producer is sun-drying until the root is brittle enough to snap when bent. This may take 7 to 15 days, according to weather conditions and will reduce the moisture content to about 10 per cent.

When dealing with a large crop, artificial drying is undertaken. A flue-heated drying chamber is employed in which the root is dried at a temperature of 130°F. in about 3½ days. Root may also be dried on a kiln similar in design to a hot-table copra kiln. During drying the root must be turned occasionally. Practically all the dirt on the root falls away during the process of drying.

Another method of drying is practised in which the fresh root is chopped into lengths of about 6 inches before drying. Chopped root is easier to handle and dries quicker than whole root. This method is not favoured by local buyers who prefer whole roots to ensure freedom from adulteration. It has also been stated that loss of toxic content may result from chopping the root. This is not substantiated by the results of experiments carried out by this Department in which chopped root has been stored for a period exceeding 6 months without change of either rotenone content or ether extract.

Packing.

The root is exported in bales covered with sacking, the overall measurements being 42 inches by 30 inches by 28 inches; the bale when packed weighs approximately 175 lbs.

If the root is chopped as described, the nett weight of root in a bale can be increased to about 250 lbs. In this way a substantial reduction of freight charges can be secured.

The root should be baled and covered immediately after drying, otherwise the material is liable to attacks of boring beetles. A detailed account of pests of stored derris has already been published (7).

Yield and Cost of Production.

As a sole crop, yields of air-dry root (approximately 10 per cent. moisture) are about 1,000 to 1,200 lbs. per acre. The proportion of air-dry root to fresh root is between 40 and 45 per cent.

It is estimated that, under favourable conditions, the total f.o.b. cost of production of derris is about 25 cents (Straits currency) per lb.

Uses.

Derris is an essential ingredient of many proprietary insecticides. It may be used in the form of a dust or as a spray. For these purposes the material must be finely ground. Considerable success has been obtained in England with derris as a specific against warble fly, and treatment of infested cattle with a derris wash is one of the methods recommended by the Ministry of Agriculture. It is also extensively used as a dust in the treatment of numerous pests on fruit trees, flowers and vegetables.

The fresh root is used locally as an insecticide mainly in market gardens. For this purpose it is pounded to a pulp under water, using 1 lb. of fresh root to 18 gallons of water. The milky liquid so obtained is sprayed direct on the plants. Such a solution may be preserved in a closed container by means of the addition of a small amount of formalin.

References.

1. Henderson, M. R. The Sources of "Tuba" in the Malay Peninsula. *Malayan Agricultural Journal,* Vol. XXII, No. 3, March, 1934, p. 125.
2. Milsum, J. N. Derris Cultivation in Perak. *Malayan Agricultural Journal,* Vol. XXIV, No. 8, August, 1936, p. 590.
3. Georgi, C. D. V., Lambourne, J., and Gunn Lay Teik. Preliminary Selection Experiments with Derris. *Malayan Agricultural Journal,* Vol. XXIV, No. 8, August, 1936, p. 374.
4. Georgi, C. D. V., Lambourne, J., and Gunn Lay Teik. Variations in Toxicity of Some Races of *Derris elliptica*. *Malayan Agricultural Journal,* Vol. XXV, No. 5, May, 1937, p. 187.
5. Georgi, C. D. V., Greig, J. L. and Gunn Lay Teik. Varietal and Manurial Trials with Derris. *Malayan Agricultural Journal,* Vol. XXIV, No. 6, June, 1936, p. 268.
6. Georgi, C. D. V. and Gunn Lay Teik. Notes on the Preparation of Derris Root for Export together with a Suggested Method of Evaluation. *Malayan Agricultural Journal,* Vol. XXIV, No. 10, October, 1936, p. 489.
7. Miller, N. C. E. Coleopterous Pests of Stored Derris in Malaya. Department of Agriculture, Special Bulletin, Scientific Series, No. 14, 1934.

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THE MALAYAN OIL PALM INDUSTRY IN 1936.

Prepared by the Economics Branch of the Department of Agriculture, S.S. & F.M.S.

The Malayan oil palm industry made rapid strides during 1936, in proportion with the increase in areas which came into bearing and also the increase in age of the palms.

The production of palm oil and kernels (as declared by estates) is shewn in the following table together with figures for the years 1934 and 1935 for the purpose of comparison.

Table I.

Malayan Production of Palm Oil and Kernels.

(As declared by estates.)

	Palm Oil			Palm Kernels		
	1934	1935	1936	1934	1935	1936
	Tons	Tons	Tons	Tons	Tons	Tons
Federated Malay States ...	12,965	17,339	23,081	2,013	2,711	3,791
Unfederated Malay States ...	4,510	5,764	8,812	795	818	1,341
Total Malaya ...	17,475	23,103	31,893	2,808	3,529	5,132

With the present planted area a continued annual increase in output may be anticipated until the total production exceeds 52,000 tons of oil, and 10,000 tons of palm kernels.

Areas.

During the year under review 1,071 acres were planted with oil palms, the total area planted now amounting to 65,227 acres. Assuming that palms planted before 1932 are now in bearing, the fruiting area amounts to 87.7 per cent. of the total planted area.

The distribution of the areas under this crop and of reserve land are given in Table II.

Of a total of thirty-four oil palm estates, nine are over 2,000 acres each, fourteen between 500 and 2,000 acres, and eleven under 500 acres. Twenty-eight estates were in production at the end of the year.

Table II.

Acreage Planted with Oil Palms at the end of 1936.

State	Area planted before 1932	Area planted 1932—1936	Total planted area	Reserve land unplanted
	Acres	Acres	Acres	Acres
Perak ...	17,362	43	17,405	8,051
Selangor ...	13,080	710	13,790	3,204
Negri Sembilan ...	940	963	1,903	1,940
Pahang ...	788	220	1,008	534
Total F.M.S. ...	32,170	1,936	34,106	13,729
Johore ...	24,403	5,978	30,381	30,292
Kelantan ...	600	140	740	717
Total U.M.S. ...	25,003	6,118	31,121	31,009
Total Malaya ...	57,173	8,054	65,227	44,738

Imports and Exports.

There are small imports only of palm oil—almost entirely from Sarawak—the total for 1936 being 141 tons. Table III summarizes exports of oil and kernels during the past three years. Practically the whole production was handled and exported in bulk.

Table III.

Malayan Net Exports of Palm Oil and Kernels.

Year	Palm Oil		Palm Kernels	
	Amount	Value	Amount	Value
	Tons	$	Tons	$
1934 ...	15,851	1,365,147	3,195	167,549
1935 ...	24,597	3,286,559	3,892	235,475
1936 ...	29,296	3,942,663	4,964	351,446

Prices.

The market for palm oil and kernels fluctuated considerably during 1936. As is shewn in the following table of comparative prices, whereas the average price of oil in 1936 was practically the same as in the previous year, the market for kernels appreciated considerably. In the case of palm oil, prices are c.i.f. Liverpool, basis 5 per cent. free fatty acids, and, for palm kernels, are for fair average Malayan quality, c.i.f. landed weight on the Continent.

Table IV.

Palm Oil and Kernel Prices in 1935 and 1936.

(Per ton)

	Palm Oil						Palm Kernels					
	1935			1936			1935			1936		
	£	s	d	£	s	d	£	s	d	£	s	d
Highest Price ...	24	10	0	28	0	0	10	5	0	16	10	0
Lowest Price ...	16	10	0	15	0	0	7	0	0	8	10	0
Average Price ...	19	19	8	19	18	2	8	13	9	11	0	11

Review.

The Wholesomeness of Canned Foods.

By H. B. Cronshaw, Ph. D. Information Circular No. 2, 20 pp. Illustrated. Issued gratis by the International Tin Research and Development Council, Manfield House, 378, Strand, London, W.C. 2.

From every field of scientific research upon nutrition, chemical, bacteriological, biological or physiological, there has been in recent years an abundant harvest of knowledge which has shown the necessity for revising many of the firmly established ideas on diet. Enlightened nations are making great efforts to hasten these changes by educative propaganda amongst all sections of the community. Much of the information disseminated for this purpose concerns the nutritive value of the various kinds of foods that are ordinarily available. To-day when the majority of fresh foods can be had already prepared and cooked in cans, it is essential in the public interest to supplement this information with the facts which have so far been ascertained as to the effect of the canning process on nutritive values. A survey of these facts has been prepared in the form of the booklet by a well-known writer on food manufacture, now reviewed.

The need for a means of preserving foods in a form convenient for safe storage and distribution led to the discovery by Appert, in France, over a century and a quarter ago, of the method of heat sterilization which made possible at once the canning industry. The work of Pasteur later on prepared the way for the scientific improvements which have made canned foods "the safest foods we eat" in the words of one authority quoted. The methods used in canning and the principles of the process are stated shortly in this booklet, and the extreme suitability of the can for the purpose is explained. The question of the safety of canned foods is thoroughly discussed in regard to the possibility of harmful effects arising from contact of the foods with the metal of the container and from decay or decomposition of them by bacteria. Medical testimony to the harmlessness of canned foods is not lacking and for the many reasons given their purity and quality need not be doubted. The evidence as to the extent to which vitamins and other nutritive values are affected by canning and by cooking is considered. It is of particular interest that the British medical authorities have drawn special attention to the advantages to health made possible by the consumption of canned fresh foods in winter time.

Under modern conditions of life canned foods are becoming more and more of a necessity and the world output is already twelve thousand million cans a year.

Abstract.

TWENTY-NINTH REPORT ON NATIVE RUBBER CULTIVATION IN THE NETHERLANDS INDIES.*

(Fourth Quarter, 1936).

Special Export Duty on Native Rubber.

In view of the introduction on January 1, 1937, of the general individual restriction measures to be applied to the native rubber cultivation, the quarter under review constituted the last period in which the export of native rubber from the great rubber regions was governed and regulated by means of levying a special export duty. In the course of this last period this levy has run a rather tempestuous course, seeing that Government, both through the depreciation of the guilder and by reason of the sharp price increase in the rubber market, found it necessary rigorously to increase the special export duty and very keenly to watch the further market course with its price advances and declines.

The measures necessary to be applied after the currency depreciation have already been discussed in the preceding Report, for which reason it may suffice here to state that immediately upon the depreciation the special export duty was increased from 37 to 47 cents per kg., in connexion with which at the same time, in the shape of a temporary measure, the dates to which the coming into force of this duty had been postponed—for blanket 30 days, and for sheet 12 days—were cancelled.

On October 1, 4, 8, 11, and 20 this duty increased to 48, 50, 52, and again 51 cents, respectively. At the same time that the export duty on November 1st was advanced to 52 cents, the exceptional measure prevailing for Palembang, where on wet rubber a duty was still being levied that amounted to 90 per cent. of that on dry rubber, was rescinded, so that from this date onward all export of native rubber became subject to one and the same duty. On November 3, 6, 8, 18, and 19 new increases followed, namely to 53, 54, 55, 56, and 57 cents respectively, whilst on December 8th the last increase was made, this time to 59 cents; on December 15th the last alteration occurred, the export duty on that date being fixed at 57 cents.

Upon the increase made on November 8th the periods of grace for blanket and sheet were again introduced so as to give the trade in these products in view of the time required for the remilling, smoking, and sorting, once more a sound and solid basis. The coming into effect of the last reduction of the export duty to 57 cents was subsequently advanced for blanket and sheet to December 24th with a view to stimulating the export of these products before the end of the year, especially considering the shortage of ready rubber in the London market.

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* Abstract from *The Netherlands Indies*, Vol. V, No. 2, 28th February, 1937.

By maintaining the special export duty the rubber price, in the regions where it was being applied, was retained at a low level up to December 15th, after which date there were no further increases in the export duty. As a result the price improvement in the world market after this date exercised an advancing tendency upon the inland price level. Another factor causing the price to rise was the approaching individual restriction: by adjusting the price of harvest permits to a level considerably below the export duty the exporters towards the end of December began to supply themselves with rubber at advancing rates, in order to be able to export this against transfer payments. This was the main cause underlying the low December export of native rubber.

Exports.

During the 4th quarter of 1936 exports of native rubber amounted to 37,525 tons,* which is 2,378 tons below the permitted quota of 39,903 tons.

The export for the whole of the year 1936—exclusive of 30 tons which are still chargeable to 1935—amounted to 151,370 tons. In order to discover to what degree the exported (or still to be exported) 1936 production falls within the permitted quota one may not lose sight of the rubber which towards the end of the year was placed in charge of the customs and which, though actually to be exported in 1937, is nevertheless still chargeable to 1936, and which amounts to 354 tons. Thus we find that there is chargeable to the year 1936 a total amount of 151,724 metric tons which is 1,750 tons or 1.14 per cent. less than the actually permitted quota of 153,474 tons. It is clear, therefore, that the system of levying an export duty, in so far as it has been rigidly applied in 1936 has certainly had the required effect in connexion with the carrying out of the obligations entered into, despite the many difficulties which have presented themselves, especially these past several months.

In the regions where individual restriction was applied, production, which at the end of the 3rd quarter was 4 per cent. below the quota allowed, when taken over the entire restriction year 1936, was only 0.13 per cent. behind, so that practically speaking, all the production permits supplied were made use of.

The proportion of dry rubber in the exported quantities largely increased in the course of the 4th quarter, amounting to 94.8 per cent., as against 82.1 per cent., 81.7 per cent. and 80.1 per cent., respectively, for the preceding quarters. This proportion over the whole year amounted to 84.6 per cent., as against 62.7 per cent. in 1935.

The important increase in the export of dry rubber during the 4th quarter to a great extent is the result—due to the enhancement of the dry weight of the exported "wet" native rubber in some of the provinces to upwards of 90 per cent.—of the unavoidable abolishment of the discrimination between dry and wet rubber (slabs) in connexion with the levying of the export duty towards the end of September, except for Palembang where this was not done until November 1. In the Provinces of Sumatra's East Coast, Riouw, and Palembang, where until well in the third quarter great quantities of slabs were still being exported, this

* ton = metric ton of 2,200 lbs.

export in the course of the quarter under review has decreased considerably. It is noticeable that in these districts the producers were not able immediately to adapt themselves to the new situation, in view of the fact that, although there was an important reduction in the export of slabs, nevertheless the export of blanket and sheet rubber was subject to but a comparatively speaking minor increase.

The direct exportation of the dry qualities of native rubber to consuming regions other than Singapore and Penang has increased from 37,274 tons in 1935, to 54,919 tons in 1936. The share represented by these quantities in the total export of native rubber, namely 144,892 tons in 1935, and 151,000 tons in 1936, has also increased from 25.7 per cent. to approximately 36.3 per cent. In proportion, therefore, the export to Singapore and Penang, where practically all other native rubber is sent, has decreased in consequence of the increased export of dry qualities. Notwithstanding this fact, both Singapore and Penang continue to occupy for the native rubber from the Netherlands Indies an important position amongst the various destinations, as is evidenced by a comparison between the quantities of dry rubber exported there with the total export of these qualities. The total export of blanket and sheet in 1935 amounted to 90,842 tons, and in 1936 to 128,127 tons, of which 53,568 and 73,208 tons, respectively, went to Singapore and Penang, or 59 per cent. and 58.7 per cent., respectively; which relatively speaking does not indicate a decrease worth the mention.

The most noticeable change is exhibited by the export of sheet to the United States, seeing that, in an absolute sense, this increased from 4,261 tons in 1935, to 13,717 tons in 1936, or, in percentages of the total export, from 2.9 per cent. to nearly 9.1 per cent., and in percentages of the entire export of dry qualities from 9.4 per cent. to 20.3 per cent.

General Introduction of Individual Restriction.

Beginning January 1937, the entire native rubber cultivation of the Netherlands Indies became subject to an individual restriction arrangement, thus putting an end to the levy of a special export duty on native rubber, which system of restriction, though having been sufficiently effective in 1936, has hardly given much satisfaction in the course of the restriction years just past as regards its consequences for the rubber producing population.

The registration of the native rubber holdings was completed in proper time, so that there was no delay in the issue of harvest permits for the year 1937. In order to be able to calculate the size of such harvest permits, it was necessary first of all to divide the standard quota for native rubber over the various rubber producing Provinces. For this division the rubber exports from these Provinces over the years 1933-1935 inclusive, were taken as a basis.

For figuring the individual standard productions the point of issue was the number of tappable rubber trees tapped per owner, to which was added the corrected number of tappable trees left untapped; the correction figure used for this purpose, with the exception of the South and East Division of Borneo, for all

Provinces was put at one quarter; for the South and East Division of Borneo the correction figure of the trees left untapped was fixed at one-tenth. The number of trees thus found after correction was multiplied by a planting distance corrector and a class corrector the size of which was derived from the preliminary outcome of 850 tapping tests carried out. By adding the number of "unit trees" thus found for each individual owner of a rubber holding for each Province, and by dividing the standard provincial figure by the numbers so obtained, it was possible to find for each separate Province the value per unit tree. By multiplying the number of unit trees per owner with the value per unit tree the individual standard production was determined to which the international restriction percentage can be applied.

The issue of the harvest permits in principle takes place quarter by quarter in three coupons, each of which indicates the export quantity per owner per month.

It was observed that the outcome of the registration was somewhat too low, due to the fact that in several Provinces, owing to a fear that taxes would be assessed, a fairly large number of holdings were either registered at too low a figure, or were not registered at all. In 1937 a right to claim has been established against incorrect registration, so that it is to be expected that in the course of this year the returns made too low to a great extent will be corrected.

Since an early beginning had to be made with the issuance, the lowered restriction percentage announced on December 15th by the International Rubber Regulation Committee could not any more be worked up into the harvest permits, so that these have been made valid at about 70 per cent. of the individual standard productions.

The harvest permits issued must be exchanged against assignments, in doing which the cess due must be paid. The period during which the harvest permits and the assignments written out therefore are valid amounts to one year in Sumatra, and to six months in Borneo.

As was to be expected, the native population, immediately the harvest permits were issued to them, exchanged them for ready cash, as has also been done by the native rubber growers in those Provinces where individual restriction had already been introduced. They were purchased by the trade at a high figure, in connexion with which the speculative element played a not inconsiderable part. The trade, therefore, will have to obtain further supplies through the purchase of rubber not covered by harvest permits, so that there will be a market for harvest permits and for rubber not so covered. At what level these two price courses will move it cannot be predicted with any degree of certainty. Various factors undoubtedly will play an important part in this connexion, such as the world market price of rubber, the quantity which will have to be produced by native growers, the effect of the flow of money into the rubber districts upon the native population's willingness to tap, and so on. Only actual practice in this respect will cause the price level to be determined, and this in the beginning is not without its risks for the trade.

It will be possible to obtain an insight into the development of these various factors towards the end of the next quarter.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports by Agricultural Officers.

May, 1937.

The Weather.

In Kedah, Province Wellesley and Penang the heavy rainfall of April continued for the first ten days of May, after which there was a fortnight of fairly dry weather followed by heavier rainfall towards the end of the month. The monthly precipitation was above normal over the area mentioned.

Throughout the inland areas of Perak and Selangor rainfall was generally below the average for the month, especially so at Taiping and Batu Gajah.

With the exception of the Bernam peninsula in Selangor and Dindings in Perak, the rainfall was much below normal from Parit Buntar to Kukup at all stations on the west coast of the Peninsula for which records were received. Johore Bahru participated in this sub-normal precipitation as also did Port Dickson, a station which comes within the west coast region of rainfall. The precipitation was abnormally heavy at Panchang Bedena in the Bernam peninsula and at Pengkalan Baharu, Dindings.

There appears to have been a belt of heavier rainfall from Seremban through Kuala Pilah, Jementah and Segamat to Kluang, for the rainfall was above average for May at all these stations.

Throughout Kelantan and Pahang the rainfall approximated to normal for the month, there being good distribution with fairly frequent showers, except at Kuantan, where drier conditions than normal prevailed.

Remarks on Crops.

Padi.—Ploughing was begun under satisfactory conditions in Kedah, Malacca and in Negri Sembilan, whilst in Kelantan, ploughing was general on the dry padi areas and has commenced on some of the wet padi lands.

In Pahang, transplanting is in progress in the down river mukims of Lipis District and in the Temerloh and Bentong Districts.

At Panchang Bedena in Selangor, further clearing of tree stumps has been held up because of water on the fields. At Sungei Manik, a little stumping and burning is being done in some of the Lots in Stage I, but on most of them no work is in progress. The cultivators, therefore, do not appear to be taking advantage of the later planting dates very reluctantly agreed to in response to their insistent request.

Further demonstrations of ploughing and cultivation with the *tajak* were given in various parts of Pahang.

Rubber.—The price of the commodity declined during the month. It is reported from most Circles that the price of coupons declined proportionately to a greater extent than the price of the commodity covered by coupons. The figures for Selangor are a good example; for a picul equivalent the present price of coupons is from $14 to $15, as compared with $25 for April and $34 for March.

Prices for rubber not covered by coupons tended to be steadier and, in fact, in Negri Sembilan showed a slight rise, prices quoted for that State being between $23 and $24 a picul.

Kelantan report records that 36 mangles for machining rubber were ordered from the Department by small-holders during the month. The price charged by owners of mangles for their use by neighbours ranges between 50 and 75 cents per picul of rubber dealt with.

Brunei report records that 110 smoke cabinets are now erected in that State.

Pineapples.—The prices of fruit for canning have declined considerably, quotations given for first quality fruit per hundred being from 80 to 90 cents in Selangor and from $1 to $1.20 in Johore, whilst in Singapore large fruits were being purchased on growers' premises for as low as from 45 to 60 cents per hundred.

Further extension of planting in the Raja Musa reserve is recorded in the Selangor report.

Tobacco.—The planting of further areas of tobacco is recorded as having taken place in Kedah, Malacca and at Jelebu in Negri Sembilan.

Agricultural and Padi Stations.

Agricultural Stations.—Reports indicate that difficulties connected with the budding of fruit continue to be experienced at most Stations. The Agricultural Officer, Malacca, writes hopefully anent the good appearance of durians budded last month at Sungei Udang, but the Agricultural Officer, Penang, regretfully records that only two out of 35 buddings of rambutan done last month have taken, and he has budded a further six himself and rather hopes that he will prove more expert than the subordinate who recently took the short budding course at Serdang. These buddings were not done on an Agricultural Station, but for the owner of a fruit plantation. At Kuala Kangsar, a concrete propagator has been built to assist the rooting of marcots and the establishment of budded seedlings in pots, an adoption of the practice at the Central Experiment Station, Serdang. It is hoped that as a result of this improvement, Kuala Kangsar rambutan marcots sent to other Agricultural Stations will thrive better than heretofore. The Agricultural Officer, Singapore, still continues his practice of enarching for durian propagation. It is worthy of mention in this connexion that at the Central Experiment Station, Serdang, a fairly high proportion of successes is obtained with the budding of rambutans, but that durians have proved more difficult, probably on account of discrepancies in size and age of bud and scion. Experiments have been initiated with the use of very much younger seedlings than it has been customary to use in the past.

At the Pineapple Station, Johore, the practice of planting rows of *Crotalaria usaramoensis* immediately the land is cleared and prepared for planting gives promise of success. In the same State further progress is reported in establishing the Tangkak and the Central Agricultural Stations. At the latter, ten night arks for poultry ordered from Kuala Lumpur have been delivered.

At Kilanas Station, Brunei, the Agricultural Officer is preparing for his share of budding difficulties by sowing a large number of fruit seed to provide stocks.

Sickness of livestock is reported from two Stations. At Ayer Itam Station in Penang, the death occurred of both the stud middle-white boar, which was obtained from Cheras Station some time ago, and of a newly born litter of middle-white piglets, the progeny of the stud boar and a sow obtained from the Central Experiment Station, Serdang.

Padi Stations.—Ploughing was commenced at the Rantau Panjang and Jitra Stations in Kedah; at Pulau Gadong in Malacca; at Pahang Tua in Pahang; at Jementah in Johore and, for dry padi, at the Central and Bachok Stations in Kelantan.

Transplanting was in progress at the Kerdau, Pulau Tawar and Bawang Stations in Pahang and at Tenglu Station in Johore.

Short Instruction Courses.

At Sungei Udang Station, Malacca, a short course in practical agriculture was given from the 1st to 8th May to twenty boys from the English schools of Malacca. The course covered instruction and demonstration in gardening, fruit propagation and selection of budwood, rubber manufacture from tapping to smoking the sheet in the smoke cabinet, copra making on the drying cabinet, padi selection, poultry rearing and the selection of hens for laying.

A similarly comprehensive course was given to penghulus from the Jasin and Alor Gajah Districts, demonstrations rather than lectures being made use of, and, wherever possible, the penghulus carried out the work themselves after demonstrations.

The opportunity was taken to inform and discuss with the penghulus the objects of the Farm School, and they were given an outline of the subjects and work covered in the year's course.

DEPARTMENTAL NOTES.

School of Agriculture, Malaya.

The new session at the School of Agriculture commenced on 19th May, 1937, with 70 pupils in residence, of whom 24 are Second Year Students, 22 are First Year Students and 24 are taking the One Year Course.

The nationality of students is as follows: 39 Malays, 28 Chinese and 3 others. Thirty-nine students come from the Federated Malay States, 24 from the Straits Settlements and 7 from the Unfederated Malay States.

Appointment.

Mr. F. R. Mason, at present acting State Agricultural Officer, Perak, has been appointed by the Secretary of State for the Colonies as Deputy Director, Department of Agriculture and Fisheries, Palestine. He has been granted 6 months and 22 days vacation leave to commence on 11th June, 1937, prior to taking up the duties of his new appointment.

Mr. Mason has served in Malaya for over fifteen years. Appointed in 1922 as Assistant Mycologist he was transferred to the Field Branch two years later. During his service he has been stationed in various parts of the country so that his experience is wide and he has an intimate knowledge of the agricultural conditions in Malaya which may be valuable to him in his new post. He takes with him the good wishes of his colleagues in the Department of Agriculture, S.S. and F.M.S.

Transfer.

Consequent upon the departure of Mr. F. R. Mason, acting State Agricultural Officer, Perak, Mr. J. W. Jolly, State Agricultural Officer, Negri Sembilan, will proceed to Perak to act as State Agricultural Officer, and, as a temporary arrangement, Mr. C. L. Newman, State Agricultural Officer, Selangor, will officiate as State Agricultural Officer, Negri Sembilan, in addition to his own duties.

Leave.

Mr. J. L. Greig, Assistant Agriculturist, has been granted 7 months and 8 days leave from 21st May to 28th December, 1937, inclusive.

Statistical.

MARKET PRICES.

May, 1937.

Major Crops.

Rubber.—The market was steadier during May than in the previous month, but weakened considerably towards the close. Spot loose opened at 36 cents per lb., and, after slight weakening, rose to 38¾ cents on the 10th May. The price fell again (to 35½ cents), recovering to 36 cents on the 21st, falling further at the end of the month to close at 34⅛ cents.

The average price for the month of No. 1 X. Rubber Smoked Sheet was 35.94 cents per lb. as compared with 40.23 cents in April. The London average price was 10.25 pence per lb., and the New York price 21.07 cents gold, as compared with 11.55 pence and 23.56 cents gold in the previous month.

Prices paid for small-holders' rubber at three centres during the month are shewn in Table I.

Table I.

Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, May, 1937.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.		Kuala Kangsar, Perak.		Batu Pahat, Johore.			
	6	20	5	19	5	12	19	26
Smoked sheet	44.90		44.00	43.00			42.75	42.50
Unsmoked sheet		42.00			42.00	43 00	40.00	40.94
Scrap		33.00						

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

No purchases at Kuala Kangsar on the 12th and 26th May, and at Kuala Pilah on the 13th and 27th May.

Palm Oil.—The market fell still further during May, and the downward trend is shewn in Table II.

Table II.
Prices of Palm Oil and Palm Kernels.

Date 1937.	Palm Oil in Bulk, c i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
May 7	£ 23. 0. 0	£ 13. 10. 0
„ 14	21. 0. 0	13. 0. 0
„ 21	21. 10. 0	12. 5. 0
„ 28	21. 0. 0	12. 5. 0

Copra.—After a slight improvement in the first week of May, the Singapore market weakened considerably, but made a slight recovery towards the close. The sun-dried grade opened at $6.85 per picul, and after reaching $7 on the 3rd, fell to $6.25 on the 19th May; it improved to $6.50 on the 24th, but closed at $6.40 on a falling market. The average price for the month was $6.55 per picul as compared with $7.55 in April. The mixed grade remained steadily 50 cents lower throughout the month, an average of $6.05 against $7.14 in April.

Copra cake was quoted throughout the month at $2.50 per picul.

Rice.—The average wholesale Singapore prices of rice per picul in April were as follows:—Siam No. 2 (ordinary) $4.40, Rangoon No. 1 $3.57, Saigon No. 1 $3.70, as compared with $4.44, $3.60 and $3.82 in March. The corresponding April 1936 prices were $3.95, $3.45 and $3.67.

The average retail prices in cents per gantang of No. 2 Siam rice in April were: Singapore 29, Penang 37, Malacca 33, as compared with 29,36 and 30 in March.

The average declared trade value of imports of rice during April was $3.91 per picul, as compared with $3.92 in March and $4.15 in February.

Padi.—The Government Rice Mills, Perak, continued to pay $2 per picul for padi during May. Retail prices throughout the Peninsula ranged from 7 to 13 cents per gantang.

Pineapples.—The price of cubes fell by 10 cents per case, but otherwise prices were unchanged as compared with April. Prices per case were as follows:—G.A.Q.: Cubes $3, Sliced Flat $2.90, Sliced Tall $3.15; Golden quality: $3.30, $3.30 and $3.45 respectively.

Prices of fresh fruit per 100 were: Selangor 80 cents to 90 cents; Singapore $1.20; Johore 1st quality $1 to $1.20, 2nd quality 60 cents to 80 cents, 3rd quality 35 cents to 60 cents.

Beverages.

Tea.—Four consignments of Malayan tea were sold on the London market during May, two of upland and two of lowland tea. The former were sold at prices averaging 1s. 2¾d. and 1s. 3¼d. per lb., and the latter 1s. 2d. and 1s. 2¼d. per lb.

Average London prices per lb. during May for consignments of tea from other countries were as follows:—Ceylon 1s. 4.85d., Java 1s. 1.88d., Indian Northern 1s. 2.20d., Indian Southern 1s. 3.99d., Sumatra 1s. 0.70d.

The latest Colombo average prices available quoted from *The Weekly Tea Market Report,* 25th May, 1937, of the Colombo Brokers' Association, are as follows, in rupee cents per lb.:—High Grown Teas 81 cents, Medium Grown Teas 76 cents, Low Grown Teas 73 cents.

Coffee.—Sourabaya coffee averaged $15.94 to $17.94 per picul in Singapore as compared with $16.15 to $17.19 in April. Palembang fell still further averaging $10.88 to $12 as against $11.15 to $12.40 in the previous month.

Spices.

Arecanuts.—Singapore prices were lower during May. Splits averaged $5 to $6.69 per picul, Red Whole $6.12 to $8, Sliced $11.81 to $13.88.

The averages of the Singapore Chamber of Commerce quotations per picul were: Best $7.08, Medium $6.83, Mixed $6.08.

Pepper.—The Singapore market again weakened during the month, and average prices per picul were: Singapore Black $9.25, Singapore White $16.90, Muntok White $17.40.

Nutmegs.—Prices advanced on better buying orders. Singapore averages per picul for the month were $32.40 for both 110's and 80's as compared with $33 in April.

Mace.—Siouw advanced to $115 per picul, averaging $113 for the month as against $105 in April. Amboina was quoted throughout at $100 per picul as compared with $85 in the previous month.

Cloves.—Nominal quotations continued unchanged at $40 per picul for both Zanzibar and Amboina.

Cardamoms.—Quotations for green cardamoms in the May Ceylon Chamber of Commerce reports ranged from Rs. 2.10—Rs. 2.26 to Rs. 2.22—Rs. 2.33 per lb.

Miscellaneous.

Derris (*Tuba Root*).—There was better enquiry during May from consuming countries, and the market accordingly improved. Roots sold on rotenone content fetched $48 per picul, and roots sold on a basis of ether extract realized $30 per picul. The April prices were $44 and $25 per picul respectively.

Gambier.—Singapore prices remained unchanged throughout the month at: Block $8, and No. 1 Cube $17 per picul.

Tapioca.—Seed Pearl fell 25 cents, and Medium Pearl 50 cents per picul at the close of the month. Average prices per picul for May were: Flake Fair $5.50, Seed Pearl $5.95, Medium Pearl $6.40.

Sago.—The price of Pearl, Small Fair, improved in May, averaging $5.76 per picul, as compared with $5.50 in April. Flour, Sarawak Fair, weakened to average $3.80 as against $3.94 in April.

Tobacco.—The range of prices per picul for dried leaf were as follows:—1st quality $20 to $44, 2nd quality $15 to $34.50, 3rd quality $10 to $25. Prices in Kelantan for prepared tobacco were: $100 to $160, $85 to $120, $60 to $80.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Kohyei & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57 Trafalgar Square, London, W.C. 2.

GENERAL RICE SUMMARY*

April, 1937.

Malaya.—Imports of foreign rice during April were 57,414 tons;† exports were 10,050 tons, net imports being 47,364 tons as compared with 42,441 tons in 1936.¶

Of the April imports 48 per cent. were consigned to Singapore, 17 per cent. to Penang, 8 per cent. to Malacca, 23 per cent. to the Federated Malay States, and 4 per cent. to the Unfederated Malay States. The imports by countries of origin were as follows (in tons, percentages in brackets):—Siam 26,851 (46.7), Burma 25,884 (45.1), French Indo-China 3,833 (6.7), other countries 846 (1.5).

Of the exports during April, 65 per cent. were consigned to the Netherlands Indies, and 35 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):—Siam 7,298 (72.6), Burma 2,176 (21.7), French Indo-China 475 (4.7), parboiled 41 (0.4), local production 60 (0.6).

India and Burma.—Foreign exports during the first quarter of the year totalled 525,000 tons as compared with 386,000 tons in 1936, an increase of 36 per cent. Of these exports 4.6 per cent. were to the United Kingdom, 7.0 per cent. to the Continent of Europe, 26.1 per cent. to Ceylon, 26.1 per cent. to the Straits Settlements and the Far East, and 36.2 per cent. to other countries. The corresponding 1936 percentages were 4.7, 18.9, 30.8, 18.4 and 27.2.

Siam.—Exports of rice and rice products from Bangkok during February were 119,456 tons, as compared with 108,292 tons in 1936.

Japan.—The latest information available was published in the March Summary.

French Indo-China.—Entries of padi into Cholon during the first four months of the year totalled 608,303 tons, as compared with 661,379 tons in 1936, a decrease of 8 per cent. Exports of rice during the same period were 526,499 tons, as compared with 606,675 tons in 1936, a decrease of 13.2 per cent.

The Netherlands Indies.—According to *The Netherlands Indies Economic Bulletin*, Vol. V, No. 1, dated 31st January 1937, the area under padi harvested during 1936 amounted to 9,566,310 acres, as compared with 9,366,240 acres in 1935, an increase of 2.1 per cent.

According to the same source, imports of rice into the Netherlands Indies during 1936 totalled 227,720 tons as compared with 380,899 tons in 1935, a decrease of 40.2 per cent.

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* Abridged from the Rice Summary for April, 1937, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1936.

Ceylon.—Imports during the first four months of the year totalled 182,567 tons as compared with 186,435 tons in 1936, a decrease of 2.1 per cent. Of these imports 16.1 per cent. were from British India, 71.6 per cent. from Burma, 0.2 per cent. from the Straits Settlements, and 12.1 per cent. from other countries. The 1936 corresponding percentages were 12.4, 63.1, 0.2 and 24.3.

Europe and America.—Shipments to Europe from the East during the period 1st January to 8th April totalled 334,733 tons as compared with 289,365 tons in 1936, an increase of 15.7 per cent. Of these shipments 48.8 per cent. were from Burma, 38.4 per cent. from Saigon, 8.8 per cent. from Siam, and 4.0 per cent. from Bengal. The corresponding percentages for 1936 were 47.9, 39.2, 10.6 and 2.3.

Shipments for the Levant from the 1st January to 8th April totalled 4,587 tons as compared with 4,891 tons in 1936, a decrease of 6.2 per cent. Shipments to Cuba, West Indies and America during the same period were 71,607 tons as compared with 67,010 tons in 1936, an increase of 6.9 per cent.

MALAYAN AGRICULTURAL EXPORTS, APRIL, 1937.

PRODUCT.	Net Exports in Tons				
	Year 1936	Jan.-April 1936	Jan.-April 1937	April 1936	April 1937
Arecanuts ...	26,548	10.651	11,767	2,758	3,251
Coconuts fresh † ...	114,314†	37,772†	26,830†	11,408†	9,098†
Coconut oil ...	46,507	14,384	11,671	3,986	3,217
Copra ...	76,681	21,441	17,519	4,401	1,395
Gambier, all kinds ...	2,188	762	677	246	153
Copra cake § ...	20,438§	5,736§	4,391§	1,504§	774§
Palm kernels ...	4,964	1,293	2,015	310	445
Palm oil ...	29,296	7,605	13,155	3,205	4.020
Pineapples canned ...	76,403	22,277	27,652	6,570	8,581
Rubber ¶ ...	365,005¶	112,306¶	146,196¶	28,307¶	33,085¶
Sago,—flour ...	6,180	1,450	8,264	1,908	1,473
,, —pearl ...	3,319	1,001	1,118	294	237
,, —raw ...	7,484*	2,745*	2,560*	672*	625*
Tapioca,—flake ...	1,535	687	411	187	88
,, —flour ...	2,418*	630*	953*	201*	452*
,, —pearl ...	17,797	5,002	5,382	1,947	1,679
Tuba root ...	599	246	214	58	38

† hundreds in number. * net imports. ¶ production. § gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1937	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January ...	1,984.8	865.0	360.4	156.0
February ...	1,759.6	1,851.8	323.6	308.7
March	1,798.4	1,473.4	358.7	256.1
April ...	1,573.1	1,237.2	308.0	226.0
Total ...	7,115.9	5,427.4	1,350.7	946.8
Total January to April, 1936 ...	6.216.3	1,680.2	1,055.7	259.8
Total for the year 1936 ...	23,081.2	8,812.3	3,791.0	1,340.7

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 30TH APRIL, 1937.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber	Actual area tapped during the month acreage	Percentage of (3) to (2)	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total area not tapped (5) + (7)	Percentage of (11) to (2)
				ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING (a)					
				Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7	(8)	(9)	(10)	(11)	(12)
STRAITS SETTLEMENTS :—											
Province Wellesley ...	43,823	26,390	60.2	210	0.5	17,223	39.3	338	0.8	17,433	39.8
Malacca ...	119,988	77,815	64.9	663	0.5	41,510	34.6	2,697	2.2	42,173	35.1
Penang Island ...	2,722	1,880	69.1	128	4.7	714	26.2	106	3.9	842	30.9
Singapore Island ...	32,943	20,414	62.0	2,646	8.0	9,883	30.0	301	0.9	12,529	38.0
Total S.S. ...	199,476	126,499	63.4	3,647	1.8	69,330	34.8	3,442	1.7	72,977	36.6
FEDERATED MALAY STATES :—											
Perak ...	292,483	205,571	70.3	5,482	1.9	81,430	27.8	11,297	3.9	86,912	29.7
Selangor ...	336,824	235,158	69.8	6,969	2.1	94,697	28.1	14,772	4.4	101,666	30.2
Negri Sembilan ...	262,376	176,746	67.4	4,227	1.6	81,403	31.0	13,643	5.2	85,630	32.6
Pahang ...	83,257	50,671	60.9	7,988	9.6	24,598	29.5	13,885	16.7	32,586	39.1
Total F.M.S. ...	974,940	668,146	68.5	24,666	2.5	282,128	29.0	53,597	5.5	306,794	31.5
UNFEDERATED MALAY STATES :—											
Johore ...	457,700	312,600	68.3	14,029	3.1	131,071	28.6	45,096	9.9	145,100	31.7
Kedah ...	200,014	133,621	66.8	11,411	5.7	54,982	27.5	13,719	6.9	66,393	33.2
Kelantan ...	27,907	20,903	74.9	403	1.4	6,601	23.7	3,412	12.2	7,004	25.1
Trengganu (b) ...	4,817	3,166	65.7	nil	nil	1,651	34.3	100	2.1	1,651	34.3
Perlis (c) ...	1,458	541	37.1	nil	nil	917	62.9	177	12.1	917	62.9
Brunei ...	5,463	3,397	62.2	1,039	19.0	1,027	18.8	901	16.5	2,066	37.8
Total U.M.S. ...	697,359	474,228	68.0	26,882	3.9	196,249	28.1	63,405	9.1	223,131	32.0
Total Malaya ...	1,871,775	1,268,873	67.8	55,195	2.9	547,707	29.3	120,444	6.4	602,902	32.2

Notes :—(a) Area out of tapping on estates which have partly ceased tapping refers to areas definitely being rested and includes areas rested under rotational systems, but excludes areas on any tapping round in respect of Perlis only.
(b) Registered companies only.
(c) Rendered quarterly.

MALAYAN RUBBER STATISTICS — TABLE I

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF APRIL, 1937, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to April 1937		during the month		January to April 1937						
1	Ports	Dealers	Estates of 100 acres and over	during the month	January to April 1937	during the month	January to April 1937	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	January to April 1937
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	8,550	14,079	11,618	49,164	5,478	25,242	Nil	Nil	Nil	Nil	16,492	2,012	53,263	18,110	...	8,113	13,098	10	72
Johore ...	...	2,321	5,195	5,010	20,945	2,597	15,687	Nil	96	Nil	421	3,457	4,918	12,066	25,009	...	1,972	4,872	...	...
Kedah ...	...	464	3,070	3,047	11,883	979	4,413	Nil	Nil	Nil	Nil	1,818	1,934	8,107	8,299	...	646	3,162	...	...
Perlis ...	...	8	16	13	51	12	78	Nil	Nil	Nil	Nil	Nil	25	Nil	127	...	14	10	...	...
Kelantan ...	...	344	261	320	1,354	874	2,931	Nil	Nil	Nil	Nil	326	519	973	2,842	...	680	274	...	...
Trengganu ...	...	55	50	199	1,024	99	513	Nil	Nil	Nil	Nil	Nil	298	Nil	1,537	...	55	50	...	...
Brunei ...	...	1	71	50	236	69	318	...	...	...	...	...	144	...	523	...	21	56	...	...
Total Malay States	...	11,743	22,742	20,257	84,657	10,108	49,182	Nil	96	Nil	421	22,093	9,820	74,409	56,447	...	11,501	21,522	10	72
S. SETTLEMENTS :—																				
Malacca ...	...	1,586	1,234	1,243	5,092	643	2,721	Nil		Nil		3,768		12,205		...	1,633	1,110	...	...
Province Wellesley	...	2,255	547	493	1,999	84	882	Nil		Nil		8,575		28,601		...	1,869	572	...	...
Penang ...	3,209	6,392	9	19	56	39	410	2,669	12,402	13,628	55,263		Nil		Nil	3,629	5,069	17	...	...
Singapore ...	8,834	24,050	177	150	626	34	501	14,417		53,885		24,282		82,700		6,408	23,706	185	33	120
Labuan ...	...	14	Nil	Nil	Nil	15	70	50		206		Nil		Nil		...	34	Nil	...	...
Total Straits Settlements ...	12,043	34,307	1,967	1,905	7,773	815	4,584	17,136	12,402	67,719	55,263	36,625	Nil	123,506	Nil	10,037	32,311	1,884	33	120
Total Malaya ...	12,043	46,050	24,709	22,162	92,430	10,923	53,766	17,136	12,498	67,719	55,684	58,718	9,820	197,915	56,447	10,037	43,812	23,406	43	192

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	6,935	22,285	4,826	3,339	1,431	193
WET RUBBER	1,178	1,421	243	218	541	448
TOTAL ...	8,113	23,706	5,069	3,557	1,972	646

TABLE III
FOREIGN EXPORTS

PORTS	For month	January to April 1937
29	30	31
Singapore ...	40,157	131,308
Penang ...	12,385	44,094
Port Swettenham.	5,856	21,670
Malacca ...	320	843
MALAYA ...	58,718	197,915

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	January to April 1937
32	33	34
Malay States ...	31,451	128,091
Straits Settlements	2,924	12,347
MALAYA ...	34,375	140,438

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication, therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 26th May, 1937.

METEOROLOGICAL SUMMARY, MALAYA, APRIL, 1937.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes									Number of days.							
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet	Total.		Most in a day. Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more	Total.	Daily Mean.	Per cent.
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						Hrs.	Hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	90.8	73.7	82.3	94	72	84	76	85.1	85.5	17.12	434.9	4.35	25	21	4	5		166.90	5.56	45
Bukit Jeram, Selangor ...	88.5	73.8	81.1	92	72	83	77	84.7	86.6	13.84	351.5	2.73	25	21	6	3	1	190.35	6.35	52
Sitiawan, Perak ...	89.2	74.3	81.7	91	71	84	76	84.9	85.1	15.82	401.8	3.16	23	21	3	1		188.55	6.29	51
Temerloh, Pahang ...	90.5	74.1	82.3	94	73	86	76	86.6	86.8	4.01	101.9	0.71	16	14	3	4		164.80	5.49	45
Kuala Lipis, Pahang ...	90.5	72.8	81.7	93	70	86	75	85.2	85.3	8.12	206.3	2.57	19	13	2	29		157.95	5.27	43
Kuala Pahang, Pahang ...	86.8	76.0	81.4	90	73	81	78	85.5	86.9	10.83	275.1	2.57	24	21	1			148.25	4.94	40
Kallang Aerodrome, S'pore ...	86.9	76.5	81.7	93	73	83	79	83.1	84.0	10.71	272.0	2.53	19	16	9		1	130.30	4.34	35
Butterworth, Province Wellesley ...	88.1	74.8	81.5	91	72	86	77	86.4	86.8	11.57	293.9	2.96	21	21	1	1		193.20	6.44	53
Bayan Lepas Aerodrome Penang ...	88.0	75.0	81.5	92	73	83	78	85.2	86.0	12.66	321.6	3.36	22	17	5			178.80	5.96	49
Bukit China, Malacca ...	86.1	75.2	80.7	91	73	82	78	83.3	84.7	6.37	161.8	1.03	21	18	7			134.50	4.48	37
Kluang, Johore ...	89.1	72.8	80.9	93	71	82	75	82.9	83.1	10.78	273.8	3.22	17	13	3	10		144.25	4.81	39
Bukit Lalang, Mersing, Johore	87.0	73.5	80.3	91	72	79	78	83.1	82.4	2.67	67.8	0.47	21	17		1	1	160.75	5.36	44
Alor Star, Kedah ...	90.2	74.1	82.1	96	72	85	76	85.2	87.2	19.32	490.7	2.72	23	21	9			193.25	6.44	53
Kota Bahru, Kelantan ...	90.3	74.9	82.6	93	73	86	77	85.1	85.0	11.17	283.7	2.95	17	14	3			198.50	6.62	54
Kuala Trengganu, Trengganu HILL STATIONS.	88.1	74.5	81.3	91	72	83	76	85.3	86.1	8.12	206.3	1.16	23	20	2			186.75	6.23	51
Fraser's Hill, Pahang 4268 ft.	74.8	63.8	69.3	79	62	71	66	73.3	73.2	13.68	347.5	2.33	22	20	2	20		135.10	4.50	37
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	74.9	58.7	66.8	78	52	69	64	71.2	70.4	9.74	247.4	2.29	22	18	3	4		129.00	4.30	35
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	74.0	60.5	67.3	78	59	71	62			9.98	253.5	2.30	21	15	3	4		138.75	4.63	38

Compiled from Returns supplied by the Meteorological Branch, Malaya.